Remarks

The Office Action and prior art have been reviewed with care in preparing for this amendment and response. Applicant appreciates the attention of the Examiner to the application.

Claims 26, 38 and 39 were rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Claims 26, 38 and 39 are herein amended to overcome the 112 rejection.

Claims 26-30, 35, 36 and 38 were rejected under 35 USC 102(b) as being anticipated by Baxter et al. (U.S. Patent No. 5,112,717).

Baxter et al. utilizes only fine particle dry toners. It teaches that liquid developing toners cannot result in high quality and high resolution images, column 1, lines 34-41, and that dry toners are an improvement over liquid/fluid. Furthermore, Baxter et al. teaches that the dry toner be heated only to "caus[e] preferential adherence between the toner and the receiving sheet as compared to the toner and whatever surface is carrying it" since the receiving sheet is also heated. Column 3, lines 41-43. Baxter et al. does not disclose that the toner be heated to a fluid state and does not disclose that photoconductive drum 20 would be able to operate using fluid toner. In addition, Figure 2 shows that toner particles remain single definite particles which do not coalesce with each other or thermoplastic layer 9, whether after thermal-assisted printing or after thermal-assisted fixing.

The Office Action asserts that "it is apparent from Figure 2 that only a surface portion of the thermoplastic layer is preheated to cause softening so as to carry out the method." Applicant does not draw the same understanding from Figure 2. Rather, it simply appears that photoelectric drum 20 is only able to press toner as deep into the outer layers of thermoplastic layer 9 as possible without penetrating thermoplastic layer itself, i.e, the penetration of the layer equals the height of the column of toner such that a sufficiently tall column could penetrate the entire layer. As stated at column 4, lines 51-54, "Because the toner is fixed by being pushed into the layer 9, it does not spread and does not destroy the sharpness or noticeably increase the granularity provided by fine toner particles." It is clear that in order to

enable the toner to be pushed into layer 9 without spreading, the thermoplastic layer 9 must be heated beyond its surface portion.

Furthermore, Baxter et al. states that to heat the thermoplastic layer 9, in one of its several heating steps, "transfer roller 27 is heated by a lamp 7 which heats the thermoplastic layer 9 to its glass transition temperature which assists in the transfer of the toner to layer 9 by partially embedding toner in layer 9." As is evident from Figure 1, toner is transferred from drum 20 to thermoplastic layer 9. Therefore, receiving sheet 1 must be positioned on transfer roller 27 such that paper support 10 is between thermoplastic layer 9 and roller 27. Since thermoplastic layer 9 is being heated by transfer roller 27, it cannot be that the surface portion of thermoplastic layer 9 is heated to a higher temperature than the rest of layer 9. Instead, the entire thermoplastic layer of Baxter et al. is heated to appreciably the same state and the drum transfers toner onto the outer surface.

In another heating step, fixture station 4 is depicted as having a preheating device 140 which is shown as being a conduction heater which heats thermoplastic layer 9 through paper support 10 (such that heat must pass through inner stratums of layer 9 to reach its outer surface). While Baxter et al. states that other types of heating devices could be used, it does not disclose or suggest that only a surface portion of thermoplastic layer 9 be softened.

Finally, column 7, line 52-57 states: "With the heating being accomplished by roller 158 through the support 10 all of thermoplastic layer 9 can be heated above its glass transition temperature without locally overheating the portion of the thermoplastic layer which contacts rollers 157." As is evident, Baxter at al. clearly contemplates heating the entire thermoplastic layer and does not disclose or suggest otherwise.

In summary, Baxter et al. fails to disclose that its toner be fluid or that only the surface portion of the thermoplastic layer be softened.

Claims 31-34, 37 and 39-46 were rejected under 35 USC 103(a) as being unpatentable over Baxter et al. in view of Rimai et al. (U.S. Patent No. 4,927,727). It is first noted that Rimai et al. not only does not utilize electrographic printing, but rather teaches away from it by discussing its shortcomings. Therefore, it teaches away from a combination with Baxter et al.

Nonetheless, the Office Action states that it would be obvious to use the thermoplastic toner of Rimai et al. in the process of Baxter et al. However Rimai et al. does not disclose use of a toner having the properties claimed by Applicant. For instance, Rimai et al. states at column 6, lines 28-34: "In the process of this invention, the receiver is preheated to a temperature such that the temperature of the receiver during transfer will be adequate to fuse the toner particles at their points of contact but will not be high enough to melt the toner particles, or to cause contacting particles to coalesce or flow together into a single mass." Therefore, Rimai et al. explicitly teaches against the assumption made in the Office Action that Rimai et al. suggests a toner which becomes fluid.

Furthermore, in view of the fact that Rimai et al. rejects use of a fluid toner, the combination of Baxter et al and Rimai et al. would not suggest or teach use of toner particles which are of the same composition as the thermoplastic material since such material must be fluid to accept the toner. Rimai et al. states that the toner particles must not melt, but must instead sinter at their edges. If such particles were used with the method of Baxter et al. and had the same composition as the thermoplastic layer, then the thermoplastic layer would sinter at its edges and would not allow the toner to enter into it without spreading.

In summary, Rimai et al and the combination of Baxter et al and Rimai et al. do not teach or suggest the use of fluid toner or the use of a toner particles and thermoplastic receiving material of the same composition. Moreover, the asserted result of the combination of Baxter et al and Rimai et al. which utilizes toner particles and thermoplastic receiving material of the same composition is not operable since the Rimai et al. particles cannot be fluid and the Baxter et al. thermoplastic receiving material must be heated above the temperature at which it sinters to absorb the toner.

With regard to specific claims, Applicant believes that claim 26, as amended, and the claims depending therefrom are allowable since the cited prior art does not teach that only a surface portion of the thermoplastic material be brought to a material reactive state.

Applicant believes claim 27, as amended, is further supported as being allowable since the prior art does not teach that the toner be fluid.

Applicant believes claim 32 is further supported as being allowable since the prior art does not teach that the toner and thermoplastic material be fluid in their respective reactive states.

Applicant believes claim 33 is further supported as being allowable since the prior art does not teach that the surface portion of the thermoplastic material heat the toner upon contact such that the toner reaches the toner reactive state.

Applicant believes claim 37, as amended, is further supported as being allowable since the prior art does not teach that the thermoplastic toner particles are of the same thermoplastic material as the surface.

Independent claim 39, as amended, requires that the thermoplastic toner particles be of the same composition as the thermoplastic material and that the toner be heated to a toner reactive state before being printed onto the thermoplastic material. Applicant believes that these claim requirements are not disclosed or suggested by the prior art and that claim 39 and its dependent claims are allowable.

Applicant believes claim 40, as amended, is further supported as being allowable since the prior art does not teach that only the surface portion of the thermoplastic material is heated to the material reactive state.

Applicant believes claim 41, as amended, is further supported as being allowable since the prior art does not teach that the toner is fluid in the toner reactive state.

Independent claim 43, as amended, requires that a toner be electrographically printed onto a thermoplastic material and be heated upon contact therewith to reach a toner reactive state and that the thermoplastic material and the toner form a consistent material composition. Applicant believes that these claim requirements are not disclosed or suggested by the prior art and that claim 43 and its dependent claims are allowable

Applicant believes claim 46, is further supported as being allowable since the prior art does not teach that the toner particles and the material are of the same material selected from the group consisting of polyethylene, polypropylene, polystyrene, polycarbonate and acrylonitrile butadiene styrene.

New independent claim 47 has been added to more clearly define Applicant's invention. No new matter has been entered. Claim 47 requires that a thermoplastic material in

a raw state be supplied to a processing machine, processed by being heated to a material reactive state and molded into a molded thermoplastic material; then while still in the material reactive state from processing, being directly printed on by a toner consisting of a coloring agent and thermoplastic toner particles; and finally hardened thereby establishing a bond between the toner and the molded material. This method is clearly not disclosed or suggested by the prior art and represents a significant advance since it allows use of the heat from processing to facilitate printing and finishing. Applicant believes claim 47 and its dependents are allowable over the prior art.

Applicant believes that new claim 49 is further supported as being allowable since the prior art does not teach that the toner is fluid.

Applicant believes that new claim 50 is further supported as being allowable since the prior art does not teach that the toner particles are of the same composition as the thermoplastic material.

Therefore, Applicant believes that all rejections have been traversed by amendment and argument and all claims are in proper form for allowance. Early favorable action is earnestly solicited. The Examiner is invited to call the undersigned attorney if that would be helpful in facilitating resolution of any issues which might remain.

Please debit Deposit Account 10-0270 for the necessary fees associated herewith.

Respectfully submitted,

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